

# COST *and* MANAGEMENT

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## Budget Control—How to Get Started

By G. E. F. SMITH, C.A.,

*Richardson, Smith, Ferrie & Co., Hamilton.*

(Before Central Ontario Chapter, at Guelph, November 20, 1930.)

THE purposes of this article are: (1) To show the futility and even danger of distributing fixed overhead and expenses; of not separating them from the fluctuating overhead and expenses, and of placing them in incorrect positions in a statement of costs or earnings, and, (2) To suggest that monthly manufacturing, trading and profit and loss accounts may be drawn up without putting through journal entries for materials used or for expenses or overhead; and to suggest that overhead, especially in a seasonal business, should be absorbed according to production and sales rather than in equal monthly amounts.

The manager of the Blank Manufacturing Company Limited (which makes soup, or soap, or spaghetti, or something else by the pound) called in his accountant one day in the middle of December.

"Jones," he said, "I want you to prepare a budget showing approximately how we may expect to come out next year."

This was a tall order, but Jones was a worker and in a week's time, with the assistance of the sales manager, buyer, production engineer, and others decorated with less formidable titles, was able to present statements 1 and 2 to the manager.

### Future Sales

"So," said the manager (looking at statement 1), "we're going to make \$27,965 next year? I think we can do better than that. I see you estimate the sales at 9,550,000 pounds. Why! we're going to sell 1,000,000 pounds more than that. Where did you get your figures?"

"From the sales manager," replied Jones. "He said that was the limit to expect owing to hard times."

"The sales manager's 'all wet,'" declared the manager. "There may be hard times now but they won't last all next year. Tell me, suppose we did sell another million pounds—and there's really no 'suppose' about it, for we're going to do it—how much more money would we earn?"

"Well," replied Jones, "the statement shows a net profit of .29 cents a pound, so on another million pounds the earnings would be \$2,900, provided, of course, selling prices and costs will remain constant."

"Are you sure?" asked the manager. "I notice that factory expenses are estimated at \$68,000, or .76 cents per pound. If we produce a million pounds more the cost will not remain at .76 cents per pound but will be lower, because included in the \$68,000 are certain items which do not vary in amount no matter what quantity is produced; such as superintendent's and foremen's salaries, repairs to machinery and building, taxes and insurance on machinery and building. Also, such items as in direct wages, fuel, sundry expenses,

## BUDGET CONTROL—HOW TO GET STARTED

light and power, all of which will be included in the \$68,000, do not increase or decrease in the same proportion as production increases or decreases. For example, the fuel bill might be \$6,000 for producing 3,000,000 pounds and only \$9,000 instead of \$12,000 for producing twice that quantity. Depreciation which you show at \$30,600 certainly will not be .34 cents per pound if 1,000,000 more pounds are produced.

"Expenses of selling, distribution and administration, the figures for which are \$105,600, or 1.09 cents per pound, contain items of expense which do not vary in amount with sales, and others which vary only in part with changes in volume of sales.

### Would Separate Fixed and Partly Fixed Expenses from Fluctuating

"It seems to me," continued the manager, "that what you have to do before you can answer my question of how much more we shall make if we sell another million pounds, is to separate the fixed and partly fixed overhead and expenses, both factory and selling, from the fluctuating. By fluctuating I mean that amount which varies proportionately with volume."

The manager then turned to statement 2. "I see," said he, "that you have drawn up a budget for each of our three different lines. You show, of course, the same net profit as in statement 1, viz., \$27,965; line A earning \$41,680, line B \$9,325, and line C losing \$23,040.

"Do you really think we should be \$23,040 better off at the end of the year if we ceased manufacturing line C?"

"Well, not exactly," replied Jones, "I know, of course, that if we did not run line C the fixed overhead and expenses would all have to be borne by lines A and B."

"And knowing this," said the manager, "you prepared this statement suggesting that line C was going to lose us \$23,040?"

"Well," replied Jones, "the book I have on cost accounting does not distinguish between fixed and fluctuating overhead and expenses, and says that all overhead must be absorbed before true costs and net earnings can be determined."

"That is quite true," said the manager, "but when making up costs you should first collect the amounts for materials, direct wages, fluctuating factory and selling expenses and overhead. The sum of these will be the cost before fixed overhead and expenses.

"The cost, before fixed overhead and expenses are considered, is the lowest amount at which you can sell without losing money, and therefore it is very necessary to know what such cost is. This cost may be considered as the fluctuating cost, which means the cost that varies in proportion with volume of production. For example, the cost of ten pounds will be exactly ten times the cost of one pound.

"Selling price," continued the manager, "is often determined by the market and may be lower than fluctuating cost plus some percentage of fixed overhead and expenses. At the same time it will likely be good business to sell, as any price above fluctuating cost is contributing towards liquidation of the fixed overhead and expenses.

### Defines Gross Profit

"If you are able to make your own selling price you can add to the fluctuating cost an amount which will yield a fair gross profit.

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By gross profit, I mean the difference between selling price and fluctuating cost and before considering fixed overhead and expenses, whether factory or selling.

"Whether a certain article or line is profitable or not profitable is properly decided by the gross profit and not by any net profit which may have been obtained after some deduction for fixed charges.

## STATEMENT I

### BLANK MFG. CO. LIMITED

#### ESTIMATED MANUFACTURING, TRADING, AND PROFIT AND LOSS ACCOUNTS FOR YEAR ENDING DECEMBER 31, 1930

	Amount	Cents Per Lb.	Lbs.
January 1, 1930, manufactured goods on hand.....	168,150.00	11.21	1,500,000
Add cost of production	990,900.00	11.01	9,000,000
Materials No. 1 used, 270,900.00		3.01	
Materials No. 2 used, 325,800.00		3.62	
Materials No. 3 used, 34,200.00		.38	
Materials No. 4 used, 175,500.00		1.95	
Direct wages, 85,900.00		.95	
Factory expenses, 68,000.00		.76	
Depreciation, 30,600.00		.34	
	1,159,050.00	11.01	10,500,000
Deduct:			
December 31, 1930, manufactured goods on hand.....	104,595.00	11.01	950,000
Cost of sales.....	1,054,455.00	11.04	9,550,000
Gross sales .....	1,285,430.00	13.46	9,550,000
Deduct:			
Freight .....	75,200.00		
Sales tax absorbed ....	22,210.00		
	97,410.00	1.04	
Net sales .....	1,188,020.00	12.42	9,550,000
Deduct:			
Cost of sales, as above.....	1,054,455.00	11.04	
Gross profit .....	133,565.00	1.38	9,550,000
Gross profit, as above .....		1.38	133,565.00
Deduct:			
Expenses of selling, distribution and administration .....		1.09	105,600.00
Net profit .....		.29	27,965.00

## BUDGET CONTROL—HOW TO GET STARTED

"Let us imagine that line A shows a gross profit of twenty-five per cent., line B fifteen per cent., and line C five per cent., and that the fixed overhead and expenses on all together are ten per cent. of the total fluctuating cost. Nothing will be gained by taxing line C with ten per cent. or with any other percentage of the fixed charges. As it is line C is contributing towards the liquidation of the fixed charges by earning a gross profit of five per cent., and until something else earning a larger gross profit is found it will be advisable to keep on with the line.

"The point I wish to make is, that one can better judge what is or what is not profitable or what else may be more profitable by stopping at the gross profit. Fixed overhead and expenses can be better dealt with and comprehended as a whole.

"If it had not been known that the fixed charges were ten per cent. and line C had been taxed with some percentage of the total overhead and expenses, it probably would never have been discovered that the line was really contributing to the net profits by earning part of the total fixed items.

### STATEMENT 2

#### BLANK MFG. CO. LIMITED

#### ESTIMATED MANUFACTURING, TRADING, AND PROFIT AND LOSS ACCOUNTS FOR YEAR ENDING DECEMBER 31, 1930

	<i>Total</i>	<i>Line A</i>	<i>Line B</i>	<i>Line C</i>
January 1, 1930, manufactured goods on hand	168,150.00	55,500.00	76,100.00	36,550.00
Add:				
Cost of production .....	990,900.00	315,300.00	320,300.00	355,300.00
	<u>1,159,050.00</u>	<u>370,800.00</u>	<u>396,400.00</u>	<u>391,850.00</u>
Deduct:				
December 31, 1930, manufactured goods on hand	104,595.00	41,500.00	37,400.00	25,696.00
Cost of sales .....	<u>1,054,455.00</u>	<u>329,300.00</u>	<u>359,000.00</u>	<u>366,155.00</u>
Gross sales .....	1,285,430.00	444,460.00	438,025.00	402,945.00
Deduct:				
Freight and sales tax....	97,410.00	36,500.00	34,500.00	26,410.00
Net sales .....	<u>1,188,020.00</u>	<u>407,960.00</u>	<u>403,525.00</u>	<u>376,535.00</u>
Deduct:				
Cost of sales, as above..	1,054,455.00	329,300.00	359,000.00	366,155.00
Gross profit .....	<u>133,565.00</u>	<u>78,660.00</u>	<u>44,525.00</u>	<u>10,380.00</u>
Deduct:				
Expenses of selling, etc.	105,600.00	36,980.00	35,200.00	33,420.00
Net profit .....	<u>27,965.00</u>	<u>41,680.00</u>	<u>9,325.00</u>	<u>*23,040.00</u>

\*Loss

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"In this statement 2 you have not separated overhead and expenses into fixed and fluctuating, therefore it is impossible to say how much better or worse off we shall be by continuing line C."

Three days later Jones presented statements 3, 4, and 5 to the manager.

The manager, looking at statement 3, commended Jones for the manner in which it was drawn up.

"I see," he said, "that you have settled upon amounts for fixed and fluctuating factory overhead and expenses, each for indirect wages, fuel, sundry expenses and materials and light and power. How did you arrive at the figures?"

### STATEMENT 3

#### BLANK MFG. CO. LIMITED

#### ESTIMATED FACTORY OVERHEAD AND EXPENSES FOR YEAR ENDING DECEMBER 31, 1930

	<i>Total</i>	<i>Fixed</i>	<i>Fluctuating</i>
Superintendents' and foremen's salaries....	6,500.00	6,500.00	
Indirect wages .....	13,800.00	7,500.00	6,300.00
Fuel .....	12,000.00	3,500.00	8,500.00
Sundry expenses and materials.....	9,500.00	3,200.00	6,300.00
Light and Power .....	7,500.00	4,700.00	2,800.00
Repairs to machinery and equipment .....	6,500.00	6,500.00	
Repairs to building .....	3,200.00	3,200.00	
Taxes on property .....	5,500.00	5,500.00	
Insurance .....	3,500.00	3,500.00	
<b>Total .....</b>	<b>68,000.00</b>	<b>44,100.00</b>	<b>23,900.00</b>

#### ESTIMATED EXPENSES OF SELLING, DISTRIBUTION AND ADMINISTRATION FOR YEAR ENDING DECEMBER 31, 1930

	<i>Total</i>	<i>Fixed</i>	<i>Fluctuating</i>
Commission .....	20,500.00		20,500.00
Travelers' salaries and expenses.....	17,500.00	8,750.00	8,750.00
Advertising .....	10,500.00	10,500.00	
Sales discounts allowed .....	4,500.00		4,500.00
Bad debts .....	1,900.00		1,900.00
Management and office salaries .....	26,500.00	26,500.00	
General traveling expenses .....	2,500.00	2,500.00	
Office expenses .....	5,500.00	5,500.00	
Legal and auditing .....	1,700.00	1,700.00	
Interest paid bank .....	14,500.00		14,500.00
	<b>105,600.00</b>	<b>55,460.00</b>	<b>50,150.00</b>

Production in lbs. .... 9,000,000.00  
Sales in lbs. .... 9,550,000.00

	FACTORY EXPENSES		SELLING EXPENSES	
	<i>Fixed</i>	<i>Fluctuating</i>	<i>Fixed</i>	<i>Fluctuating</i>
Costs in cents per lb. ....	.45	.27	.58	.53

# BUDGET CONTROL—HOW TO GET STARTED

## STATEMENT 4

### BLANK MFG. CO. LIMITED

ESTIMATED MANUFACTURING, TRADING, AND PROFIT AND LOSS  
ACCOUNTS FOR YEAR ENDING DECEMBER 31, 1930

	<i>Amount</i>	<i>Cents Per Lb.</i>	<i>Lbs.</i>
January 1, 1930, manufactured goods on hand.....	168,150.00	11.21	1,500,000
<i>Add:</i>			
Cost of production, varying with volume .....	916,200.00	10.18	9,000,000
Materials No. 1 used, 270,900.00		3.01	
Materials No. 2 used, 325,800.00		3.62	
Materials No. 3 used, 34,200.00		.38	
Materials No. 4 used, 175,500.00		1.95	
Direct wages, 85,900.00		.95	
Fluctuating factory expenses 23,900.00		.27	
	1,084,350.00	10.18	10,500,000
<i>Deduct:</i>			
December 31, 1930, manufactured goods on hand.....	104,595.00	11.01	950,000
<i>Factory cost of sales, varying with volume .....</i>	979,755.00	10.26	9,550,000
<i>Add:</i>			
Expenses of selling, etc., varying with volume .....	50,150.00	.53	
<i>Total cost of sales, varying with volume .....</i>	1,029,905.00	10.79	9,550,000
<i>Gross sales .....</i>	1,285,430.00	13.46	9,550,000
<i>Deduct:</i>			
Freight ..... 75,200.00			
Sales tax absorbed .... 22,210.00	97,410.00	1.04	
<i>Net sales .....</i>	1,188,020.00	12.42	9,550,000
<i>Deduct:</i>			
Cost of sales as above .....	1,029,905.00	10.79	
<i>Gross profit .....</i>	158,115.00	1.63	9,550,000
<i>Gross profit, as above .....</i>		1.63	158,115.00
<i>Deduct fixed costs:</i>			
Depreciation .....	30,600.00	.31	
Factory expenses .....	44,100.00	.45	
Selling, etc. ....	55,450.00	.58	
		1.34	130,150.00
<i>Net profit .....</i>		.29	27,965.00

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### How Figures Were Obtained

"By discussion with the superintendent and foremen and by consulting available records," replied Jones. "A study was made of the payrolls together with production records covering different periods, and we found that wages to be paid to general helpers working for the benefit of all lines could not be less than \$7,500, if production should be at its lowest. Therefore, we reasoned that \$7,500 out of the estimated amount of \$13,800 for the year should be considered as fixed."

"That sounds all right to me," said the manager. "I suppose you attacked the other items in a similar manner?"

#### STATEMENT 5

#### BLANK MFG. CO. LIMITED

#### ESTIMATED MANUFACTURING, TRADING, AND PROFIT AND LOSS ACCOUNTS FOR YEAR ENDING DECEMBER 31, 1930

	<i>Total</i>	<i>Line A</i>	<i>Line B</i>	<i>Line C</i>
January 1, 1930, manufactured goods on hand	168,150.00	55,500.00	76,100.00	36,550.00
<i>Add:</i>				
Cost of production varying with volume .....	916,200.00	290,400.00	295,400.00	330,400.00
	<u>1,084,350.00</u>	<u>345,900.00</u>	<u>371,500.00</u>	<u>366,950.00</u>
<i>Deduct:</i>				
December 31, 1930, manufactured goods on hand	104,595.00	41,500.00	37,400.00	25,695.00
	<u>979,755.00</u>	<u>304,400.00</u>	<u>334,100.00</u>	<u>341,255.00</u>
<i>Add:</i>				
Expenses of selling and distribution, etc., varying with volume:				
Freight and sales tax	97,410.00	36,500.00	34,500.00	26,410.00
Selling, etc. ....	50,150.00	18,500.00	16,720.00	14,930.00
	<u>1,127,315.00</u>	<u>359,400.00</u>	<u>385,320.00</u>	<u>382,595.00</u>
<i>Cost of sales, varying with volume .....</i>	<u>1,127,315.00</u>	<u>359,400.00</u>	<u>385,320.00</u>	<u>382,595.00</u>
<i>Gross sales .....</i>	<u>1,285,430.00</u>	<u>444,460.00</u>	<u>438,025.00</u>	<u>402,945.00</u>
<i>Gross profit .....</i>	<u>158,115.00</u>	<u>85,060.00</u>	<u>52,705.00</u>	<u>20,350.00</u>
<i>Gross profit, as above.....</i>				158,115.00
<i>Deduct fixed costs:</i>				
Depreciation .....			30,600.00	
Factory expenses .....			44,100.00	
Selling, etc., expenses .....			55,450.00	
			<u>130,150.00</u>	
<i>Net profit .....</i>				<u>27,965.00</u>



# BUDGET CONTROL—HOW TO GET STARTED

## STATEMENT 6

### BLANK MFG. CO. LIMITED FACTORY OVERHEAD AND EXPENSES

	<i>Total</i>	ESTIMATED FOR YEAR ENDING DECEMBER 31, 1930		ON BOOKS TO APRIL 30
		<i>Fixed</i>	<i>Fluctuating</i>	
Superintendents' and foremen's salaries .....	6,500.00	6,500.00		2,170.00
Indirect wages .....	14,500.00	7,500.00	7,000.00	5,000.00
Fuel .....	12,000.00	3,500.00	8,500.00	1,500.00
Sundry expenses and materials .....	9,000.00	3,200.00	5,800.00	7,000.00
Light and power .....	7,500.00	4,700.00	2,800.00	2,500.00
Repairs to machinery and equipment .....	5,800.00	5,800.00		5,000.00
Repairs to building .....	3,500.00	3,500.00		3,000.00
Taxes on property .....	5,500.00	5,500.00		
Insurance .....	3,500.00	3,500.00		3,500.00
	<u>67,800.00</u>	<u>43,700.00</u>	<u>24,100.00</u>	<u>29,670.00</u>

### EXPENSES OF SELLING, DISTRIBUTION AND ADMINISTRATION

	<i>Total</i>	ESTIMATED FOR YEAR ENDING DECEMBER 31, 1930		ON BOOKS TO APRIL 30
		<i>Fixed</i>	<i>Fluctuating</i>	
Commission .....	20,500.00		20,500.00	4,000.00
Travelers' salaries and expenses .....	16,000.00	8,750.00	7,250.00	5,300.00
Advertising .....	10,500.00	10,500.00		2,000.00
Sales discount allowed ....	4,500.00		4,500.00	1,100.00
Bad debts .....	1,900.00		1,900.00	
Management and office salaries .....	25,000.00	25,000.00		8,300.00
General traveling expenses	2,300.00	2,300.00		570.00
Office expenses .....	5,000.00	5,000.00		1,500.00
Legal and auditing .....	1,700.00	1,700.00		
Interest paid bank .....	14,500.00		14,500.00	3,500.00
	<u>101,900.00</u>	<u>53,250.00</u>	<u>48,650.00</u>	<u>26,270.00</u>

	<i>Estimated</i>	<i>To Date</i>	<i>Balance</i>
Production in lbs. ....	10,000,000	4,500,000	5,500,000
Sales in lbs. ....	10,500,000	2,000,000	8,500,000

	FACTORY		SELLING	
	<i>Fixed</i>	<i>Fluctuating</i>	<i>Fixed</i>	<i>Fluctuating</i>
Costs in cents per lb. ....	.44	.24	.51	.46

# COST AND MANAGEMENT

## STATEMENT 7

### BLANK MFG. CO. LIMITED

MANUFACTURING, TRADING, AND PROFIT AND LOSS ACCOUNTS  
FOR FOUR MONTHS ENDED APRIL 30, 1930  
COST OF SALES VARYING WITH VOLUME

	Amount	Cents Per Lb.	Lbs.
<i>Sales ex. carry over</i> .....	33,630.00	11.21	300,000
<i>Sales ex. new goods</i> .....	172,890.00	10.17	1,700,000
Materials No. 1 used, 51,340.00		3.02	
Materials No. 2 used, 61,710.00		3.63	
Materials No. 3 used, 6,460.00		.38	
Materials No. 4 used, 32,980.00		1.94	
Direct wages, 16,320.00		.96	
Fluctuating factory expenses, 4,080.00		.24	
	206,520.00	10.33	2,000,000
<i>Add:</i>			
Fluctuating expenses of selling, etc. ....	9,200.00	.46	
	215,720.00	10.79	2,000,000
<i>Gross sales</i> .....	270,000.00	13.50	2,000,000
<i>Deduct:</i>			
Freight .....	15,200.00		
Sales tax absorbed .....	5,200.00		
	20,400.00	1.02	
<i>Net sales</i> .....	249,600.00	12.48	2,000,000
<i>Deduct:</i>			
Cost of sales, as above.....	215,720.00	10.79	
<i>Gross profit</i> .....	33,880.00	1.69	2,000,000
<i>Gross profit as above</i> .....		1.69	
			33,880.00
<i>Deduct fixed costs:</i>			
Depreciation .....	6,200.00	.31	
Factory expenses .....	8,800.00	.44	
Selling .....	10,200.00	.51	
		1.26	25,200.00
<i>Net profit</i> .....		.43	8,680.00

## BUDGET CONTROL—HOW TO GET STARTED

"Yes," replied Jones.

"And the expenses of selling, and the like?"

"There was only one item which I considered it was important to divide," answered Jones, "travellers' salaries and expenses. The fixed amount \$8,750, represents salaries of the force in the office, and the fluctuating amount represents the salaries and expenses of the field men. The more field men we have the more business we should get, but the sales staff in the office can take care of any amount of business brought in by the travelers."

The manager then turned to statement 4 and looked it over carefully.

"Ah," said he, "this tells a different story. I think you can now answer my question—how much more money would we earn if we sold an additional million pounds?"

"Yes," replied Jones, "the gross profit is 1.63 cents per pound, therefore on another million pounds we would earn \$16,300, as the fixed costs will not materially vary from the amount shown, \$130,150."

"Well," said the manager, "that is a little better than \$2,900 which was your answer the other day. You see now how important it is to know approximately the amount of all the fixed charges."

"I see," added the manager, passing to statement 5, "that you have taken my advice and not distributed fixed overhead and expenses over the different lines. You show that line C earned a gross profit of \$20,350."

"Yes," broke in Jones. "And if we did not sell line C the gross profit of \$20,350 could not be earned, while the fixed costs would still be around \$130,150, and therefore the net profit would only be \$7,615 on the two remaining lines, instead of \$27,965 on all three."

"Well," said the manager, "you seem to know all about it now."

On the tenth of May in the next year Jones brought to the manager statements 6 and 7.

Looking at statement 6 the manager said: "I see that you have revised the estimates for some of the items of factory and selling expenses."

"Yes," replied Jones, "I intend to do so every month, using the actual amounts for each item set up on the books as a measure for more closely estimating the amount for the year. By absorbing overhead and expenses always according to lately revised estimates, the manufacturing and trading and profit and loss accounts, which I shall from now on prepare each month, should become more and more accurate."

"You use only the amounts actually set up on the books as a measure then?" asked the manager.

### Monthly Journal Entries Unnecessary

"Yes," replied Jones. "If overhead and expenses were absorbed, in the monthly statements of profit and loss according to the amounts set up on the books, it would be necessary to make journal entries every month in order to bring the different accounts up to date. For example, if book figures were used it would be necessary to see that all invoices for coal received up to the end of any month were taken

## COST AND MANAGEMENT

on the books. The amounts of fuel on hand would also have to be ascertained before the cost could be known. Other items would have to be dealt with in the same manner. A monthly journal entry would also have to be made for some proportion of depreciation. By employing estimates all such bookkeeping entries are rendered unnecessary and the monthly statements should prove to be just as accurate as if book figures had been used, especially when the estimates are revised every month."

"I notice," said the manager, "that you have changed your estimate of sales to 10,500,000 pounds. So you now think we may sell that additional million?"

"Yes," replied Jones. "The sales manager tells me that orders for future delivery are coming in pretty well. When I told him that you said he was all wet instead of getting mad he set about to prove that you were right by telling the boys that they simply had to get more orders and it looks as though the boys were getting them."

"Well," said the manager (turning to statement 7), "we haven't sold much yet, 2,000,000 pounds to the end of April. But that's not so bad for this time of the year."

"No," remarked Jones, "and if overhead and expenses had been absorbed on an equal monthly basis, instead of showing a net profit of \$8,680 a loss of \$15,606.66 would have been the result. We have sold only 2,000,000 pounds to date, but we are pretty certain to sell over 10,000,000 pounds in the year, and for this reason only one-fifth of the estimated overhead has been taken up. On the basis of equal monthly amounts one-third would have to be taken up. The difference between one-third and one-fifth of the total amount of estimated overhead and expenses for the year is \$24,286.66."

"A statement," said the manager, "showing a loss of \$15,606.66 when we know we are making money would certainly look rather foolish. Just as foolish as would a statement showing large profits taken up in the early months of a company's year if the bulk of the sales were made in those early months. I think you are quite right, when treating with a seasonal business like ours, in absorbing overhead according to volume of production and sales, especially when estimates for production and sales for the year can be gauged reasonably and are revised from month to month."

The manager still looking at statement 7 asked Jones how he got his figures for cost of materials used without taking an inventory.

Jones replying said: "All the purchases of materials are entered in a special ledger in quantities and costs, using a separate leaf for each kind. The total of the costs of the different accounts in this ledger must agree with the material account in the general ledger. Quantities are reduced from the production records, but no costs are entered opposite the quantities as in the case of materials received. At the end of any month the quantity of any material on hand can be ascertained. This, figured out at the last purchase or market price, whichever is the lower, and subtracted from the cost of material on hand at the beginning of the year plus purchases since, will give the cost of the material used to date."

"Then," said the manager, "you don't journalize through the general books the cost of materials used each month."

## BUDGET CONTROL—HOW TO GET STARTED

"No," replied Jones, "I use total cost to date and subtract therefrom the total cost at the end of the previous month for ascertaining the cost of any material used for one month."

"That seems simple enough," said the manager, "and must save a considerable amount of work."

"Yes," answered Jones. "Some people seem to think if you make a lot of journal entries each month and your general ledger balances after making them, that the accuracy of all your work has been proved. But if your journal entries themselves are not correct, then results arising out of such entries will also be incorrect. Accurate figures not put through the journal are much more reliable than inaccurate ones which have been put through. The important thing is to have accurate figures in your monthly statements and not necessarily to put them through your books."

"Now, from this statement 7, I understand," said the manager, "that if we should sell still another million pounds, our net profits would be increased by \$16,900, the rate of gross profit being 1.69 cents per pound. But for every million pounds sold up to the present estimate of 10,500,000 pounds, \$4,300 will be added to the net profits—the rate of net profit being .43 cents per pound."

"That's right," replied Jones. "Fixed costs have been absorbed according to estimated sales of 10,500,000 pounds, so the rate of net profit, in the absence of extraordinary changes in costs and selling prices, will remain approximately the same, until it is ascertained with some degree of certainty that volume of sales will exceed the present estimate."

"If it should fall below the present estimate we should lose 1.69 cents for every pound short?" said the manager.

"Certainly," said Jones. "And when I tell the sales manager that it won't make him any the less anxious to get orders."

"It's a good thing to know," said the manager, "just what effect volume of sales has on the net profits."

"Yes," answered Jones, who had thoroughly learned his lesson. "And the only way one can know is by separating fixed from fluctuating overhead and expenses."

"By the tenth of June," continued Jones, "I shall have a manufacturing, trading and profit and loss account for the five months ending May 31, and the results for the month of May will be obtained in half-an-hour by subtracting the figures of the April statement from those of the May statement."

"Fine," said the manager. "You may go now. Here's a ticket for the hockey game to-morrow night."

Jones, who was on the verge of asking for a raise, felt, on the top of this munificent gift, that he simply couldn't do it, and walked out of the room in receipt of the same salary as when he entered it.

### COMMITTEES FOR CURRENT YEAR

The following are standing committees of the Society for the year 1931-32:

By-laws: The president and vice-presidents.

Chapter Programs: The president and chapter chairmen.

## Scope of Industrial Engineering in Industry

By HARRY F. WILSON,  
*Wilson & Fessenden, Kitchener, Ont.*

(Before Montreal Chapter, November 20, 1930.)

WE are in a specialization age and as industry has developed it has come to be the particular field of some men to investigate and research the factors of a business. The industrial engineer is primarily concerned with the production of goods, and his function is to develop and invent means by which more or better goods can be produced at less cost. His function is further to develop means of control in business and to devise means by which having set in motion certain causes, a definite known result will be attained.

The increase of productive effort and the constant competition between many products for the consumer dollar has necessitated the very close scrutiny of every factor in a business so as to ensure the industry a market for its product at a price which the consumer can pay. This very close analysis of the factors in business has developed the necessity of having trained men whose experience fits them for research of this nature.

### Questions About Material

Now in any manufacturing business, we have in general, the three factors of material, labor, and expense, and the field for research in any of these fields is tremendously broad. Consider for a moment the field of material and at once there comes to our mind these questions:

1. Is this the best type of material for the work it has to do?
2. Is it too good, too pure, too high grade?  
Would a substitute do?
3. How much of it must we use to fill the bill? What about waste? What standard should be set as an attainable basis for waste?
4. Is there an incentive for the operator to make as little waste as possible?
5. Can any useful by-product be made from the unavoidable waste?
6. Is the material not good enough?  
Does lack of quality make the cheaper material more costly in the long run?
7. When we come to the use of materials in the plant, how much should we carry? Why so much? How low can inventories be kept and still protect the production schedule?

Running all through such questions as these is the searching of causes, the determination of facts and the consequent foundation work for action and progress.

## SCOPE OF INDUSTRIAL ENGINEERING IN INDUSTRY

### Questions About Labor

When we come to consider the question of labor, what must the industrial engineer give heed to?

First of all he must appreciate the fact that his proposals and his work must be based on facts and appeal to the fair minded intelligence of the people with whom he is dealing. From the standpoint of a business he must be a mediator who sees that capital and labor both are parties to an equitable bargain. He must see to it that such arrangements as are made must give the manufacturer useful and workable control of the labor cost of his product and that the actual producer shall have a fair incentive for his added skill, energy, and intelligence.

Just here let me say a few words about the question of this labor cost research. We find even among cost accountants, some very weird ideas about this matter of time studies. In the setting up of rates of any time it is the function of the industrial engineer:

1. To study the materials in use and their fitness for the job.
2. To study the tools, machines and equipment with which the work is done.
3. To study the position and relativity of these producing units to other units, as to convenience of operation.
4. To observe the handling of the flow of product and its transportation to and from the producing unit.
5. To observe the working conditions of the operator, light, air, ventilation, unnecessary fatigue conditions, and so on.
6. To observe the managerial facilities which should ensure smooth operations of the producing unit, such as foreman service, mechanical service, tool-room service, knowledge of succeeding jobs in advance, etc.
7. To see what the operator's view point is: does he think he is simply a separate entity in the business, or does he feel that he is really a part of an organization, and that better wages and the development of improvements ensure the success of the concern he works for, and at the same time the permanence of his job.

All these things the efficient time study engineer must observe, but observation is only the beginning. To develop an equitable and suitable method of wage payment for the job so that it will run smoothly requires the improvement of conditions surrounding the job. This involves selling the idea to the foreman and convincing the management of the economic advisability of any necessary changes. Not infrequently the management itself is ultra-conservative and lags in brisk action. All of the above calls for tact, enthusiasm, and the necessary energy and drive to get things carried through in spite of difficulties.

### Setting Wage Rates

Once having established standard methods, materials, supply and conditions, the stage is set for the actual rate setting studies and rates.

## COST AND MANAGEMENT

These rates may take the form of straight piece rates, bonus or premium rates in some form, or, if necessary, even rates comprised of several factors covering waste, time, quality, etc. Sometimes rates should not be set on a time basis at all.

For instance: Where the potential material wastages value greatly exceeds the labor value. Sometimes, for instance, with highly expensive equipment, the output of which is very precious, actual labor cost is a small factor, and less prominent in importance than output, and in such cases special rates of different characters are desirable.

The functions of suitable wage incentives are, of course:

1. To stimulate maximum output and consequent lower unit burden costs, and lower direct labor costs.
2. To stabilize labor cost figures and consequently run the business on knowledge rather than hope.
3. To enable the payment of attractive wage rates which will reduce labor turnover and consequent training costs.
4. To increase sales by enabling the manufacturer to sell goods for less money than his class group and still make a profit.

In all of these functions profits are the incidental outcome of the rendering of better products, a better service both to the buying public and to that section of the public who themselves produce the product.

### Department Heads

In addition to the study and measurement of the condition pertinent to the actual work of the producers themselves, the executives must not be overlooked. The foremen in a plant are vital parts of the organization and respond to incentives just as we all do. But it is one thing to work out suitable incentives by measurement of the actual producers activities, but it is much more difficult and requires special ingenuity to devise incentives which will reward the foreman and superintendent for the improvement and cost reduction of the things under their control. The development of such incentive rates are extremely useful and require intimate study of the responsibilities of each executive.

In addition to the establishment of material and labor control methods, we have the large and difficult field of expense. The industrial engineer must be prepared to formulate plans for the bringing to light the facts as well as the causes of operating expense, to assist in the analysis of its sources and control where possible. Of course, these factors are all inter-related, insofar as reduced labor and material costs in production have their stimulating effect on sales and a consequent diminution of the expense load per unit. We have seen many many instances where expenses have been materially reduced simply through presenting them in a strong light and thereby drawing to them consideration as to their causes and correction.

Now, of course, we all know that this spirit of research is permeating our whole industrial fabric, and things which were accepted as standard practise yesterday are in the discard to-day. We further know that the whole course of human industrial effort is for continuous improvement and betterment, but we also are aware of the value of specialization and this is the case for industrial engineering.



## SCOPE OF INDUSTRIAL ENGINEERING IN INDUSTRY

Because plant executives in most businesses have their minds occupied with a great variety of problems, purchasing, production, customer contact, sales and financing, they are unable through lack of time and of specialized experience to concentrate their entire faculties in one problem for solution, and it is here that the industrial engineer fulfills his function because of his detachment from the current responsibilities of the business he is able to focus his whole attention on the particular phase of the business he is working on is free to conduct his research unhampered by other demands on his time, and finally to design, try, adjust and eventually formulate a simple and effective control of the activity under study. He acts as a specialized auxiliary in the business and brings to it a wealth of experience on similar problems gained in varied industries.

So many problems are common to all businesses that the industrial engineer frequently is able to apply identical principles in widely divergent industries.

### Specialized Research in Industry

Industrial engineering, then, is specialized research in industry, seeking causes, establishing controls, so that known desirable results will accrue. This spirit of research and investigation of causes is very contagious and it is usually not long before the discussion of past successes and failure and of the current work in hand opens up new avenues for consideration. The engineer who is enthusiastic about his job soon enthuses others and enlists their help in the solution of some of the problems, with the result that a new spirit of enquiry appears and every familiar action is looked into. Very often men are so close to the everyday facts and conditions of a business that they lose a certain perspective, and being creatures of habit, they continue many practices that if seen in other businesses would be questioned by them. The outside observer used to this habit of questioning habits soon observes many things which are overlooked by the people who are in daily contact with them.

This stimulation of a spirit of enquiry and of consequent progress is one of the invaluable contributions that the industrial engineer can make to a business. Usually executives respond to this stimulation of a new viewpoint with very surprising results in some cases.

If the industrial engineer can succeed in arousing or stimulating enthusiasm for the job in hand and get this spirit into the minds of the executives with whom he is working, he has gone a long way toward the solution of many of his problems. The freshness of viewpoint and freedom from any traditions in the business, coupled with the knowledge that the outside engineer is one whose business it is to solve business difficulties is bound to hearten and encourage those with whom he has to work.

The field of industrial engineering is broad, but where is the business where the last word has been said in improvement and progress. Economic events during the late war showed us what vast reserves of productivity are lying dormant, and when necessity or stimulation demands improvement, these latent forces of action appear. In every business there are many avenues where concentrated effort along definite lines will produce a definite degree of progress, and it is the business of industrial engineering to find these avenues and to explore their possibilities.

## The Cost of Producing Wheat

**L**AST autumn the Manitoba Free Press, of Winnipeg, offered prizes for the best answers to the question, What does it cost to produce a bushel of wheat? An appeal was made to farmers who had records extending over the last five years, to send in their statements. Three points were stressed particularly by the judges, viz., that the final cost figure for producing a bushel of wheat was not considered in placing the winners, but the methods by which the contestant arrived at his conclusion were; that the farmers who are keeping accounts and whose accounts indicate a production cost of 60 cents a bushel are probably growing grain at a considerably lower cost figure than the average farmer in the west; and that the question of yield per acre is a decidedly important one in cost figures.

The best answer, as submitted by Bruce Edie, of Dugald, Man., is set forth below:

### The Best Answer

We found since starting on your competition that farm costs is a hard form of accounting. We have kept careful books for years, but find such factors as interest on investment and depreciation on machinery and cost of horsefeed rather knotty problems. After a two-evenings' struggle for a formula or a means of calculating depreciation it was found by taking actual life of machine and compounding interest on a depreciating principal that the income tax method of deducting ten per cent was close enough for all practical purposes.

Also the horsefeed. Should grain be charged at sale value or production cost? We consider that grain produced one year is actual capital for next year, either for sale or feed. Some may challenge the prices for horsefeed. We live a few miles from Winnipeg and these are actual prices obtained for grain, hay, and straw. Some may think that our horses do not accomplish as much as should be expected, but the land is heavy and requires much work owing to weeds. The soil contains no sand or stone so depreciation and repairs on machinery are low.

Owing to co-operative buying, oil and gasoline are cheaper than at most points.

Wages are allowed on each operating day plus fifty cents per day for board, which the cook assures us is sufficient.

Practically all field work is done by hired men, the owner being occupied by care of stock, repairs, business, etc. Any day worked on land by owner is balanced by time lost through bad weather by men. Care of horses when idle is not allowed for. This is done by owner or man employed at other gainful occupation than wheat growing, at no added expense. It may be considered that the owner's wages are his profits (?) or loss.

The interest and tax on the unbroken land is just carried by value of pasture and sale of fuel.

The calculations are based on average cost of land. (See table attached.) These could be varied by calculating on each quarter according to original cost, but the farm is operated as a unit, so it is

## THE COST OF PRODUCING WHEAT

fairer to average the cost. Five per cent simple interest is considered an equitable return for invested capital, that being about the limit for safe investment.

The cost of brushing, stumping and breaking on quarter-section "D" has been charged to capital cost. Two double discings and two harrowings are charged to the crop.

Taxes and interest on summer-fallowed land are charged for both years to the following crop.

Itemized statements of investment in land, machinery and wheat growing operations follow. From these we have deduced the cost to raise a bushel each year for five years and found the average cost to be 81 2/5 cents per bushel.

### Size of Farm and Value

Acreage of farm .....	620 acres
Cultivated land .....	400 acres
Bush and pasture .....	220 acres
"A" 1/4 section cost \$15 per acre 30 years ago.	
"B" 1/4 section cost \$60 per acre 15 years ago.	
"C" 1/4 section cost \$20 per acre 4 years ago.	
"D" 1/4 section cost \$31 per acre 3 years ago.	
Average cost per acre \$31.50.	

### Machinery

Bought partly new and part at sales.

Fordson and plow .....	\$ 820
Gang plow .....	96
Cultivator .....	100
Drill .....	240
Binder .....	240
Threshing outfit and stook loader .....	4,000
Engine disc .....	100
Wagons, 3 boxes, 5 racks .....	400
8 work horses with harness .....	920

### Cost of Keeping Horses

Oats, 1930; 60c a bushel selling value.  
 Oats, 1929; 58c a bushel selling value.  
 Oats, 1928; 56c a bushel selling value.  
 Oats, 1927; 51c a bushel selling value.  
 Oats, 1926; 36c a bushel selling value.

Average \$0.522 per bushel.

Timothy, average price .....	\$14 per ton
Sweet clover, average price .....	\$6 per ton
Average cost of hay .....	\$10 per ton
Fed half and half.	
1 working day, 16 lbs. of hay per day, per horse .....	\$ .08
1 working day, 1/2 bus. of oats per day, per horse .....	.26
Total cost .....	.34
120 working days, per horse, 34x120, \$40.80.	

## COST AND MANAGEMENT

1 idle day, 5 lbs. sweet clover per day, per horse .....	\$ .015
1 idle day, 10 lbs. straw per day, per horse .....	.02
1 idle day, grain, 7 to 8 lbs. per day, per horse .....	.115
Total cost .....	.15
245 idle days at \$0.15 .....	\$36.75
plus 120 working days at \$0.34 .....	40.80
Total for year .....	77.55
For one working day:	
\$77.55 divided by 120 .....	\$ .66
Average value of each horse and harness \$115.00	
Average depreciation \$11.50	
Depreciation per day .....	.031
Total cost per horse per day is .....	.69

### One Day Operations

**Drilling.** 18 acres a day.  $400 \div 18 = 22$  drilling days.

Horses, 4 .....	$.69 \times 4 = \$2.76$
Man .....	2.00
Depreciation .....	\$24.00
Repairs .....	5.00
	$29.00 \div 22 = 1.318$
One day of 18 acres costs .....	\$6.078
1 acre costs $\$6.078 \div 18 = \$0.338$ .	

**Harrowing.** 40 acres a day.  $400 \div 40 = 20$  harrowing days.

Horses, 4 .....	$.69 \times 4 = \$2.76$
Man .....	2.00
Depreciation .....	$3.20 \div 20 = .16$
Repairs negligible	
One day of 40 acres costs .....	\$4.86
1 acre costs $\$0.486 \div 40 = \$0.122$ .	

**Threshing and Hauling.** 40 acres a day. 20 threshing days (10 days are custom works).

Horses .....	$.69 \times 20 = \$13.80$
11 men; wages $\$2.50 + .50$ board $= \$3.00 \times 11 =$ .....	33.00
Gasoline, 50 gal. @ 21c .....	10.50
Lubricating oil, 2 gal. ....	2.00
Cup grease .....	.14
Machine oil, 1 gal. ....	.50
Depreciation .....	\$400.00
Repairs .....	50.00
	$460.00 \div 20 = 23.00$
One day of 40 acres costs .....	\$82.94
1 acre costs: $\$82.94 \div 40 = \$2.073$ .	

**Plowing and Horses.** 4 acres per day. 200 done  $\div 4 = 50$  plowing days.

Horses .....	$.69 \times 6 = \$4.14$
Man .....	2.00
Depreciation .....	\$9.60
Repairs, blacksmith .....	2.50
	$12.10 \div 50 = .242$

## THE COST OF PRODUCING WHEAT

One day of 4 acres costs ..... \$6.382  
 1 acre costs:  $\$6.382 \div 50 = \$1.597$ .

**Plowing with Fordson.**  $5\frac{1}{2}$  acres a day. 200 acres=36 plowing days.

Gasoline, 15 gal. @ 21c .....	\$3.15
Oil, $1\frac{1}{4}$ gal. ....	1.13
Man .....	2.00
Depreciation .....	\$82
Repairs .....	13
	$95 \div 36 = 2.64$

One day of  $5\frac{1}{2}$  acres costs ..... \$8.92  
 1 acre costs:  $\$8.92 \div 5\frac{1}{2} = \$1.622$ .

**Discing with Fordson.** 25 acres a day.

Cost is for plowing a day ..... \$8.92  
 1 acre costs:  $\$8.92 \div 25 = \$0.375$ .

**Cultivating.** 15 acres a day. 800 acres=53 cultivating days.

Horses, 6 .....	$.69 \times 6 = \$4.14$
Man .....	2.00
Depreciation .....	\$10.00
Repairs .....	5.00
	$15.00 \div 53 = .283$

One day of 15 acres costs ..... \$6.423  
 1 acre costs:  $\$6.423 \div 15 = \$0.428$ .

**Binding.** 20 acres a day. 300 acres=15 binding days.

Horses (change teams) .....	$.69 \times 8 = \$5.52$
Man .....	2.00
Depreciation .....	\$24.00
Repairs .....	9.00
	$33.00 \div 15 = 2.20$

One day of 20 acres costs ..... \$9.72  
 1 acre costs:  $\$9.72 \div 20 = \$0.486$ .

**Making and Cleaning Drains.** 100 acres a year done in one day.

Horses, 4 .....	$.69 \times 4 = \$2.76$
3 men .....	6.00
100 acres costs .....	\$8.76

1 acre costs:  $\$8.76 \div 100 = \$0.088$ .

**Sundries.** 8 wagons, 5 racks, 3 boxes.

Depreciation .....	\$40.00
Repairs .....	16.00
Forks and tools .....	8.00
Horseshoeing .....	4.00
Cost on 400 acres .....	68.00

1 acre costs:  $\$68.00 \div 400 = \$0.17$ .

## COST AND MANAGEMENT

### Costs for 1926

(All costs per acre basis)

Clover land, Durum on "A" quarter.

Interest on investment .....	\$ 1.575
Taxes .....	.797
Seed .....	2.00
Drilling .....	.338
Harrowing twice $\$0.122 \times 2$ .....	.244
Picking weeds, 5c an acre .....	.10
Twine .....	.39
Binding .....	.486
Stooking .....	.45
Threshing and hauling to car .....	2.073
\$27.50 more wages a day than 1930 .....	.687
Drains .....	.088
Fordson plowing for seed bed in 1925 .....	1.622
Cultivating twice $\$0.428 \times 2$ .....	.856
Sundries .....	.17

Costs per acre ..... \$11.876

Yield per acre, 26 bushels.

Cost per bushel:  $\$11.876 \div 26 = \$0.456$ .

### Costs for 1927

Summer-fallow Durum on "B" quarter.

1926 interest on investment .....	\$ 1.575
1926 taxes .....	.797

Summer-fallow operations.

Fordson discing .....	.357
Cultivating 6 times, $428 \times 6$ .....	2.568
Harrowing two times, $122 \times 2$ .....	.244
Plowing .....	1.597
Sundries .....	.17

### Crop Operations

1927 interest on investment .....	1.575
1927 taxes .....	.818
Seed .....	2.25
Drilling .....	.338
Harrowing two times, $122 \times 2$ .....	.244
Picking weeds, 5c an acre $\times 2$ .....	.10
Cultivating in spring owing to late spring .....	.428
Twine .....	.35
Binding .....	.486
Stooking .....	.35
Threshing .....	2.073
No hauling on account of poor crop, extra wages over 1930 only \$9.00 a day .....	.225
Drains .....	.088
Sundries .....	.17

Cost per acre ..... \$15.713

Yield 8 bus. (late spring) (frost Aug. 13).

Cost per bushel:  $\$15.713 \div 8 = \$1.964$ .

## THE COST OF PRODUCING WHEAT

### Costs for 1928

(Fall plowing.) Durum in "B" quarter.

1928 interest on investment .....	\$ 1.575
1928 taxes .....	.844
Seed .....	2.25
Drilling .....	.338
Harrowing 3 times $\$0.122 \times 3$ .....	.366
Picking weeds, 5c an acre, twice .....	.10
Twine .....	.49
(Cut one way) binding $\$0.486 \times 2$ .....	.972
Stooking .....	.63
Threshing and hauling to car .....	2.073
\$22.00 more wages per day than 1930÷40 .....	.55
Drain .....	.088
Plowing, fall of 1927 .....	1.597
Sundries .....	.17

Cost per acre ..... \$12.043

Yield per acre, 30 bus.

Cost per bushel:  $\$12.043 \div 30 = \$0.401$ .

### Costs for 1929

(1928 summer-fallow). Durum on "B" quarter.

1928 interest on investment .....	\$ 1.575
1928 taxes .....	.844
Summer-fallow operations:	
Plowing (spring) .....	1.597
Fall discing .....	.357
Cultivating, (horse) 4 times $\$0.428 \times 4$ .....	1.712
Harrowing .....	.122
Sundries .....	.17

### Crop Operations

1929 interest on investment .....	1.575
1929 taxes .....	.865
Seed .....	1.42
Drilling .....	.338
Harrowing, 2 times, $\$0.122 \times 2$ .....	.244
Picking weeds, 5c an acre, twice .....	.10
Twine .....	.415
Binding .....	.486
Stooking .....	.30
Threshing and hauling to car .....	2.073
\$16.50 more wages paid than 1930 (each day) $\$16.50 \div 40$ .....	.413
Drains .....	.088
Sundries .....	.17

Cost per acre ..... \$14.864

Yield per acre, 22 bus.

Cost per bushel:  $\$14.864 \div 22 = \$0.675$ .

## COST AND MANAGEMENT

### Costs for 1930

(Breaking), Reward on "D" quarter.

1929 interest on investment .....	\$ 1.575
1929 taxes .....	.865
1930 interest on investment .....	1.575
1930 taxes .....	8.11
Seed .....	3.00
Drilling .....	.338
Harrowing twice, $\$0.122 \times 2$ .....	.244
Picking weeds, 5c an acre, twice .....	.10
Twine .....	.33
Binding .....	.486
Stooking .....	.20
Threshing and hauling to car .....	2.073
Drains .....	.088
Discing with Fordson for seed bed at $12\frac{1}{2}$ acres a day. Cost is twice $\$0.357 = \$0.714 \times 2$ discings .....	1.428
Sundries .....	.17

Cost per acre ..... \$13.283

Yield per acre, 23 bus.

Cost per bushel, 1930:  $\$13.283 \div 23 = \$0.577$ , or 58 cents.

### Average Cost Per Bushel

(For Five Years)

1926.....	\$ .456
1927.....	1.964
1928.....	.401
1929.....	.675
1930.....	.577

$\$4.073 \div 5 = \$0.814$  per bushel.

1927 was an unusual year. I have seen none like it for 40 years, a very late spring and very early frost on Aug. 13. Omitting 1927:

1926.....	\$ .456
1928.....	.401
1929.....	.675
1930.....	.577

$\$2.109 \div 4 = \$0.527$  per bushel.

## MUST CUT MANUFACTURING COSTS

"If we have deflation, as we have, in basic or primary products, the next step must be deflation in manufacturing costs. Business can be conducted on any level, provided the costs come down to a common level. That is the big problem to-day—to get down manufacturing costs corresponding to what has taken place in the primary products," said Right Hon. Sir Thomas White, K.C.M.G., speaking at a meeting in Toronto in May.



## The Compilation and Use of Production Standards from Actual Records

By WILLIAM D. HALL,

*Director Department of Production Management, United Typothetae of America.*

(From The Typothetae Bulletin)

AT the Mid-Year meetings last spring in Cincinnati I outlined before this group a scheme of centralized production control. At the Boston convention Mr. Eisenberg addressed the Production Conference on the subject of "Profits from Centralized Production Control," explaining in detail how he was successfully operating the manufacturing departments of his business by such a management programme. Considerable interest in this subject has been manifested by a number of members, and several firms have already undertaken some steps toward the installation of similar departments.

Omitting any enumeration of the benefits of such departments or the repetition of the steps involved in their operation, I ask your consideration at this time of the question of production standards.

This is usually the first question that arises when a firm seriously starts to set up any form of production control. These standards are of vital importance to the estimator and the production manager. They must use them in the preparation of time layouts or estimates and the scheduling and routing of work through the proper sequence of operations. The management needs them to measure the efficiency of their manufacturing units with those similar units in other plants, as well as to compare the individual departments with each other over several periods of time.

These standards are of three types: First, those developed by trained time and motion study engineers; second, those which can be compiled from records of actual production in your own plant; and third, those which are established through cooperative effort on the part of the group of printers.

There is no question but that the first type is the most desirable and the most accurate, but the expenditure of many thousands of dollars is involved, and because our industry is composed of relatively small units, only a few feel that the cost and effort involved is justified. However, it must be remembered that those few companies which have set up such scientifically determined standards have been amply rewarded.

The second type, while not involving the expenditure of as much money, does require the attention of a competent and experienced production analyst and clerical help. Schedules of this type can be effectively used and readily revised as improved methods of production are put to work.

The third type is of particular value to the medium sized and smaller printers who are not in a position to obtain many records in their own plants.

## COST AND MANAGEMENT

Several years ago Typothetae members co-operated in supplying records of actual production which were analyzed, compiled and published for the benefit of our membership in the Typothetae Average Production Records book, but production standards of any type are not fixed. Better methods, improved machinery and improved quality in materials change these standards and they must be continually corrected to keep pace with these developments.

No plant can set up production standards in a few days. It requires months of effort. So while many printers do not now desire to go in for this "Production Control," they can be building up their records so that the first big step will have been taken when they do decide to install such a system.

It has been repeatedly urged that Typothetae obtain standard times which would apply to the whole industry. The Production Engineering Committee three years ago went into this subject very thoroughly, and since then no new evidence warrants a departure from their recommendations. For record purposes I am reading that portion of their deliberation at the Quebec Convention:

"The Production Engineering Committee discussed at some length the advisability of establishing standard times in preference to average times as shown at present in the production records book. The value of standard times was cited as being a goal to set up before the operating department as production volume they should attain. It was decided, however, that standard times could not be arrived at satisfactorily except by personal investigation by an engineer who would consider plant equipment, the employees, and quality, and due to the fact that conditions vary in different sections and that it would take considerable time to compile such standard times and at considerable expense, that it was better not to attempt standard times at present but to continue with average times."

So as an organization we must confine our efforts to the compilation of production records from historical records, and analyze the records taken for the elapsed time required to perform the given operation.

The second type of these standards can be accumulated without much additional work on the part of the workman, cost or production clerk.

At the Boston convention the Production Engineering Committee recommended the production of a manual on "How to Develop and Compile Production Records," and instructed the Department of Production Management to prepare the manuscript for publication. Some work has already been started toward this end and it is planned to have this material ready for approval at the New Orleans convention this fall.

Suffice it to say that by adding only another item or two to the forms now used this type of record can be easily secured.

Now about that third type of production standards and the revision of such standards as are now found in the Typothetae Average Production Records book. Since it is not feasible to revise the entire book at one time it is the plan of the committee to revise the present schedule on presswork for platens, automatics and flatbed presses—simplify the schedules and reissue them in a more compact and usable form.

## COMPILATION AND USE OF PRODUCTION STANDARDS

To this end the staff in the department at headquarters will devote its attention in the summer months. In preparation for such work it is proposed to ask the co-operation of all Typothetae members and especially the support of this body.

The plan in brief is this: To conduct a short but intensive campaign for records during the period of the latter part of May or first of June. After considerable publicity, both in the "Typothetae Bulletin" and your own Typothetae publications, to thoroughly familiarize the membership with the details of this campaign, we will supply, through the local secretaries, or direct from Washington, a number of gummed labels which the pressmen will be asked to attach to a sample sheet of every form printed during the period of the campaign and to mark on it the amount of makeready time, running time, number of impressions and if overlays were used, what kind. Suitable mailing envelopes will be provided for collecting these samples and for mailing them to the office in Washington. From that point on the necessary detail work will be handled by the staff and the schedules duly prepared.

In connection with this work it is proposed by the committee to issue standardized estimates for certain commercial items which, when filled out by the individual member, can be used as the basis on which the individual member can develop a price list for small commercial items such as letter heads, envelopes, bill heads, tickets, etc.

### NEW MEMBERS

The following are new members of the Society:

#### Montreal Chapter

Knowles, C. N., C.A., Beauharnois Power Corp., Ltd., Montreal.  
Seymour, P. F., C.A., Robert Wilson & Co., Montreal, Que.

#### Toronto Chapter

Brickenden, W. T., Thorne, Mulholland, Howson & McPherson,  
Toronto, Ont.  
Island, A. W., Canadian Acme Screw & Gear, Ltd., Toronto, Ont.  
Lightfoot, C. L., Gurney Foundry Co., Ltd., Toronto, Ont.  
McClelland, D. M., C.A., Price, Waterhouse & Co., Toronto.  
Osborne, J. E., Thomas Meadows & Co., Ltd., Toronto, Ont.  
Sorley, S. H., C.A., Thorne, Mulholland, Howson & McPherson,  
Toronto, Ont.  
Sukloff, H., Gurney Foundry Co., Ltd., Toronto, Ont.  
Taylor, J. W., C.A., Price, Waterhouse & Co., Toronto.

#### Hamilton Chapter

Weston, F. G., N. Slater Co., Ltd., Hamilton, Ont.  
Wright, H. P., Wright, Pounder & Co., Ltd., Hamilton, Ont.

#### Central Ontario Chapter

Huber, H. D., Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

#### Winnipeg Chapter

Basford, D., C.A., Douglas Basford & Co., Winnipeg, Man.

## COST AND MANAGEMENT

### COST MEN AVAILABLE

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(Firms desiring experienced help may communicate with any of those listed below, through the Society's Office, 81 Victoria Street, Toronto, Canada.)

#### MONTREAL TERRITORY

No. 1—Age 41. Married. Five years' practical training in accountancy. Considerable experience in costing since expiration of apprenticeship, also every branch of accountancy from office routine to executive duties in connection with management.

No. 2—Age 35. Married. Four years' experience cost accounting for an engineering company. Vicinity immaterial.

No. 3—Age 26. Five years' experience in accountancy which includes several years' cost accounting in paper and lumber mills. Vicinity immaterial.

No. 4—Age 36. Married. Bilingual. College education. Taken course in advanced accountancy at McGill University. Accounting experience includes preparation of commercial and industrial costs, budgets, etc.

No. 5—Age 35. Married. Experienced as factory representative, statistical reporter, general and cost accountant. Vicinity immaterial.

No. 6—Age 33. Married. Taken course of International Cost Society. Several years' experience in cost accounting. Ontario preferred.

No. 7—Age 48. Single. Bilingual. Experience in cost accounting, sales and office management.

No. 8—Age 43. Married. Graduate of College of Technology, Manchester. Many years' experience in costing of fabrics and departmental and factory costs in textile trade. Ontario preferred.

No. 9—Age 32. Married. Taking higher accountancy course, La Salle Extension University. Experienced in invoicing, stock recording, also in costing in textile trade. Montreal vicinity preferred.

No. 10—Varied cost accounting experience. Past twelve years employed by manufacturer of iron products.

No. 11—Age 48. Married. Educated in England. Admitted as C.A. in 1915. Particularly interested in cost accounting.

No. 12—Age 45. Married. Experienced in general and cost accounting. Knowledge of industrial plant work, organization and maintenance. Vicinity immaterial.

No. 13—Age 51. Married. Experience includes office managing, auditing and cost accounting.

#### TORONTO TERRITORY

No. 101—Age 44. Eighteen years' experience in cost and general accounting for coal company.

No. 102—Age 46. Married. Graduate of International Accountants Society. Twenty years' experience in accounting, office managing, and organizing. Three years' public auditing. Able to install interlocking systems.

## COST MEN AVAILABLE

No. 103—Age 34. Married. Experienced in accounting of construction costs. Toronto vicinity preferred.

No. 104—Age 30. Junior matriculant. Business studies with High School of Commerce, also Alexander Hamilton Institute. General accounting experience.

No. 105—Age 38. Many years' experience in cost accounting. Toronto vicinity preferred.

No. 106—Age 42. Married. Good education. Bonded. Business experience includes a thorough training in general and cost accounting, preparation of interim financial statements, statistical reports showing results by means of graphs and handling of office detail. Toronto preferred.

No. 107—Former student-member of Institute of Cost and Works Accountants, England. Experienced in costing of steel products.

No. 108—Age 24. Unmarried. Good education. Several years' experience in costing of automobiles.

No. 109—Age 44. Many years' experience in accounting, auditing; some in cost accounting.

No. 110—Five years' experience as cost accountant, planning engineer, purchasing agent and stockroom supervisor of lamp and stove company.

No. 111—Age 35. Unmarried. Studied engineering at Herriot Watt College, Edinburgh. Experienced time study engineer (Bedaux system).

No. 112—Age 30. Married. Studied higher accountancy course, La Salle Extension University. Experienced in compiling of all classes of reports, including balance sheet, profit and loss, sales and expense and various cost statistics. Able to install a bonus system.

No. 113—Age 34. Married. University education. Successively works managers, chief accountant and company secretary of radio corporation.

No. 114—Age 39. Married. Eleven years' experience in costing in confectionery manufacturing plant.

No. 115—Age 38. Took Alexander Hamilton Institute course. About twelve years' costing and auditing experience in automobile industry.

No. 116—Age 40. Married. Completed La Salle Extension University higher accountancy course. Sixteen years with machinery manufacturer. Now assistant to engineer, duties being to make cost investigations, estimates and supervise production. Toronto preferred.

No. 117—Age 36. Married. Good education. Bonded. Taken course in advanced accountancy at McGill University. Accounting experience includes preparation of commercial and industrial costs, budgets, etc. Experience in general and cost accounting.

No. 118—Age 25. Experienced in banking, time-keeping, pay-roll; two years' of costing.

No. 119—Industrial engineer. Thoroughly trained and capable of superintending employment work, or general employee service work.

No. 120—Age 34. Eleven years' general and cost accounting experience.

## COST AND MANAGEMENT

### HAMILTON TERRITORY

No. 201—Age 41. Many years' experience in general and cost accounting in steel industry.

No. 202—Age 29. Married. Experienced in general office work, also in cost accounting of furniture and of automobile bodies. Vicinity immaterial.

No. 203—Age 29. Married. Experienced in costing of furniture.

No. 204—Cost clerk with nine years' experience in operating stores ledgers and cost finding.

No. 205—Age 40. Married. Experienced in office managing, banking. Capable of installing Harrison standard system. Two year contract expected.

No. 206—Age 25. Partial matriculation, also business course. Four years' experience in cost department of farm implement manufacturing company.

No. 207—Age 27. Unmarried. High school education, also university training in the manufacture of woollen and worsted yarns. Experienced in costing of textiles. Vicinity immaterial.

### CENTRAL ONTARIO TERRITORY

No. 301—Twelve years' experience in all branches of furniture trade, including general and cost accounting.

### WINNIPEG TERRITORY

No. 401—Age 44. Married. Trained in accounting, economics and commercial law. Experienced in costing and statistical work. Winnipeg vicinity.

No. 402—Age 33. Graduate of La Salle higher accountancy course. Experienced ledgerkeeper, teller, pay-sergeant, general and cost accountant. Toronto vicinity.

No. 403—Age 32. Experienced in accounting and costing. Formerly secretary-treasurer of scientific farming enterprise. Preferably the east.

No. 404—Age 28. Married. Two years' engineering course at University of Manitoba. Five years' costing experience.

### VANCOUVER TERRITORY

No. 501—Age 36. Good education. Seven years' experience in installation and supervision of cost systems; formerly assistant and executive secretary of a manufacturing association. Vancouver or district.

No. 502—Age 28. Single. Good education. Taken higher accountancy course with La Salle Extension University. Experienced purchasing agent and cost accountant.

No. 503—Age 39. Long experience in cost accounting in mining industry. Vicinity immaterial.

No. 504—Chartered accountant, particularly interested in cost accounting and analytical control systems.

No. 505—Completed course in advanced cost accounting and auditing with International Accountants Society, and three-year accounting course; member by examination of the Credit Institute of Canada. Experience covers accounting in lumber, hardware and meat packers' lines.

## COST MEN AVAILABLE

### OUTSIDE CANADA

No. 601—Age 31. Married. During twelve years' experience filled the positions of purchasing agent, office manager, credit manager and cost accountant, having installed group normal or standard, and job cost systems in various lines of industry. Now in United States but desirous of again locating in Canada.

No. 602—Age 33. Chartered accountant during six years' experience conducted important investigations in Canada and U.S.A. and writing reports on audits, and cost systems. Now in United States but desirous of again locating in Eastern Canada.

No. 603—Age 45. Married. Bonded. Good education. Experienced in office management, general auditing, cost accounting.

## COST LITERATURE

### RECEIVED IN MAY

**P** RINCIPLES of Punched Card Accounting. F. H. Rowland. National Association of Cost Accountants, May 1, 1931.

Accounting for Technical Research. G. H. Klusmeyer. National Association of Cost Accountants, May 1, 1931.

Incentives for Maintenance Departments. C. P. Flora. Society of Industrial Engineers Bulletin, April, 1931.

Motion Picture Production Accounts. H. S. Brewster. Journal of Accountancy, May, 1931.

Conduct of Investigations. L. H. Graves. Accountants' Journal, April 20, 1931.

Reserve for Depreciation and Conservation of Earnings. F. L. Dunn. Certified Public Accountant, May, 1931.

Some Accounting Methods Peculiar to Motion Picture Producers and Distributors. (Part III.) A. Kaplan. Certified Public Accountant, May, 1931.

Relationship Between Cost Accounts and Financial Accounts. P. Taggart, F.S.A.A. The Accountant, May 16, 1931.

Arguments Against Depreciating Land Marshaled by Educator. Prof. R. V. Cradit. American Accountant, May, 1931.

Overhead Accounting. American Accountant, May, 1931.

Wage Incentives or What? W. T. Brickenden. Manufacturing and Industrial Engineering, May, 1931.

Depreciation. (Part III.) J. Masterson. Manufacturing and Industrial Engineering, May, 1931.

## CHAPTER NOTES

### MONTREAL

Reported by R. Schurman, C.A., Secretary.

The first meeting of the committee of the Montreal Chapter of the Canadian Society of Cost Accountants & Industrial Engineers was held at the Queen's Hotel on Monday, May 11th, 1931, at 1 o'clock. The following standing committees were appointed for the year:—

**Programme:**—R. W. Louthood, chairman; R. R. Thompson, G. C. Leroux, L. Belanger, G. T. Bowden, P. E. Dufresne, L. N. Buzzell.

**Membership:**—J. P. Masterson, chairman; H. W. Blunt, R. Schurman, J. P. Rolland, L. Rhodes.

**Dinner:**—G. T. Bowden, chairman; H. W. Blunt, S. Farquharson, R. Schurman.

**Educational:**—L. Belanger, chairman; R. R. Thompson, G. T. Bowden, D. R. Patton, L. N. Buzzell.

**Publicity:**—G. C. Leroux, chairman; H. W. Blunt, L. Belanger, R. Schurman.

A very interesting programme of activities was submitted by the chairman, Mr. R. W. Louthood, for the season 1931-32. Mr. R. O. Sweezy, president of the Beauharnois Power Corporation Limited,, will address a dinner meeting on the "Water Powers of Canada." Mr. Beaudry Leman, general manager of the Banque Canadienne Nationale and president of the Canadian Bankers' Association, is to address a dinner meeting also, the subject to be announced later.

At the regular chapter meetings a number of interesting subjects will be treated, of which the following have been agreed upon:—"Tramway Costs," by Mr. Duperron of the Montreal Tramways Limited; "Hotel Costs," by Mr. Alderic Raymond of the Windsor Hotel; "Insurance Costs," by Mr. A. J. Mylrea of Reed, Shaw & McNaught.

As the Province of Quebec is now considering the subject of workmen's compensation insurance, it is proposed to have this subject thoroughly discussed. Another subject under discussion is the subject of "Costs in the Glass Industry," to be dealt with by an official of the Dominion Glass Company.

Following the papers presented it is proposed to have the essential points brought forward in the papers under discussion at each meeting. The Chapter has offered awards to students on the subject of cost accounting attending the classes conducted under the auspices of the Board of Trade. Prizes to the amount of \$50.00 have been offered for this purpose. The Society will hold its meetings on Thursday evening.

There was a full attendance of the committee, showing the very great interest of the members in the programme for the year, and under the leadership of the chairman, Mr. Louthood, there is every indication that 1931-32 activities will surpass the previous efforts of this Chapter.



